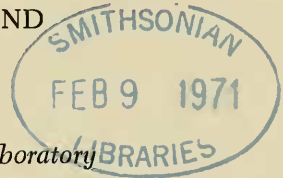


PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SOME POLYCHAETES OF THE SUPERFAMILY
EUNICEA FROM THE NORTH PACIFIC AND
NORTH ATLANTIC OCEANS¹

BY KATHARINE D. HOBSON

*Systematics-Ecology Program, Marine Biological Laboratory
Woods Hole, Massachusetts*



One new species of *Onuphis* is presented together with a discussion of and key to five other species of this genus and five new records of species of Lumbrineridae, Arbellidae, and Dorvilleidae. Most of the polychaetes from Washington were collected from the Strait of Juan de Fuca by the author while on *Brown Bear* cruise #365 (June 1965); from near Orcas Island by H. L. Sanders (July 1967), and obtained from the collections of K. Banse, K. D. Hobson, and F. H. Nichols from Puget Sound (February, April, and August 1963; October 1965). Some of the polychaetes from New England were collected from the slope off New England by H. L. Sanders (May 1961, August 1962); and from Cape Cod Bay by the Biotic Census of the Systematics-Ecology Program (February 1966 through October 1969). The latter are now deposited in the Gray Museum of the Marine Biological Laboratory (GM). Supplementary material was obtained from the following museums or institutions: the Allan Hancock Foundation (AHF), through O. Hartman and K. Fauchald; the British Museum of Natural History (BMNH), through J. D. George; the Bureau of Commercial Fisheries (BCF), through R. L. Wigley; the Museum of Comparative Zoology (MCZ), through H. W. Levi;

¹Contribution No. 215 from the Systematics-Ecology Program, Marine Biological Laboratory, Woods Hole, Massachusetts 02543. This research was supported primarily by a grant from the Whitehall Foundation to the Systematics-Ecology Program. Collection of material was supported by NSF grant GB-747 and by Contract Nonr 3070(03) from the Office of Naval Research to the Systematics-Ecology Program.



FIG. 1. *Onuphis elegans* (collection of Banse, Hobson, and Nichols, Puget Sound): a, Anterior view of 1st parapodium; b, anterior view of 25th parapodium; c, slender pseudo-compound hook from 1st parapodium; d, stout pseudo-compound hook from same.

the Pacific Marine Station Museum (PMS), through J. A. Blake; and the Smithsonian Institution (USNM), through M. L. Jones. The manuscript benefitted from discussions and correspondence with K. Fauchald and K. Banse.

SUPERFAMILY EUNICEA

ONUPHIDAE

Onuphis Audouin and Milne Edwards

All species of *Onuphis* with cirriform branchiae that begin on the first setiger were reviewed in order to better characterize *O. elegans* and *O. iridescens*. In some species important specific characters, such as first occurrence of branchiae and of subacicular hooks, were found to vary with the size of the worm. Although the species discussed below are very closely related, they can be distinguished by considering this variation together with other characters.

Onuphis elegans (Johnson)

Figure 1a-d

Northria (sic) *elegans* Johnson 1901, p. 406, pl. 8, figs. 77-85.

Nothria elegans.—Hartman 1968 (in part), p. 675, figs. 1, 2, 5 only.

Not Hartman 1944, p. 88, pl. 5, figs. 113-117.

Nothria sp. near *N. elegans* and *N. iridescens*.—Banse, Hobson, and Nichols 1968 (in part, Form A only), p. 534.

Onuphis elegans.—E. Berkeley 1927, p. 408.—C. Berkeley 1967, p. 1056.

—Berkeley and Berkeley 1932, p. 312; 1948, p. 93, fig. 141.

Material examined: WASHINGTON, syntypes of *N. elegans* (AHF; MCZ 1895) from Puget Sound.—Collections of Banse, Hobson, and Nichols from Puget Sound (10-23 m). CALIFORNIA, Tomales Bay (PMS 180241).—*Velero* station 3048 near Los Angeles Lighthouse (19 m) and five localities in central and southern California (intertidal to 18 m) (AHF). BRITISH COLUMBIA, Long Bay, E. Berkeley, collector (intertidal) (USNM 38275).

Description: Pigmentation, when present, is usually as described by Johnson. The first 5 or 6 setigers are cylindrical, then the body becomes flattened. The inner paired antennae usually extend only to setiger 3-7 (range, 3-11).

The branchia of the first parapodium (Fig. 1a) is longer than the dorsal cirrus and becomes relatively longer farther posteriorly. The branchiae are thick (Fig. 1b) in setigers 10 through 60-80, rather than slender as in the other species treated here (c.f., Figs. 2d, 3b, 5a). Ventral cirri are usually cirriform through setiger 5, (setiger 6 in the specimens from Long Bay, B.C.).

Pseudocompound hooks occur in the first four setigers (rarely 3). The hooks are usually tridentate (Fig. 1c, d) but the third tooth may be very small (as in Fig. 2f). I have found bidentate hooks without a trace of a third tooth only in the specimens from Long Bay, B. C. and in a specimen from Tomales Bay, California. These specimens also have a few quadridentate hooks. Supraacicular narrowly limbate setae are present from the first setiger, appearing faintly hairy. Pectinate setae are present

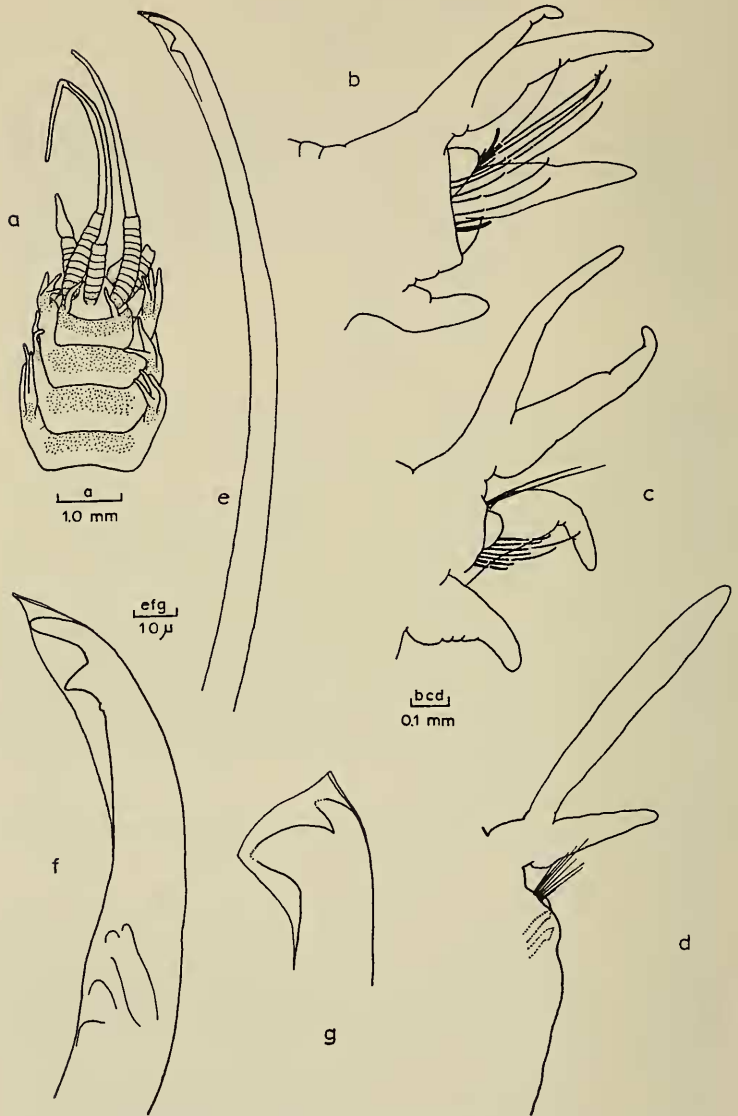


FIG. 2. *Onuphis farallonensis* new species: a, Dorsal view of anterior end of holotype (AHF), setae omitted (stippling indicates location of pigment); b, anterior view of 1st parapodium; c, anterior view of 5th parapodium; d, anterior view of 26th parapodium; e, tip of slender pseudocompound hook from 1st parapodium; f, stout pseudocompound hook

from the first setiger, are distally slightly oblique, and have about 14 teeth. There are no compound spinigers. Subacicular hooks usually begin on setiger 9 (occasionally on 10 or 11).

The tube is parchmentlike with adherent sand grains.

Remarks: There does not seem to be any variation of specific characters with size of this species. *Onuphis elegans* is characterized by its short antennae, thick branchiae, and first occurrence of subacicular hooks from setiger 9 (occasionally 10 or 11).

Distribution: British Columbia to southern California, intertidal to 23 meters.

***Onuphis farallonensis* new species**

Figure 2a-g

Nothria elegans.—Hartman 1944, p. 88, pl. 5, figs. 113–117; 1968 (in part), p. 675, figs. 3–4 only. Not *N. elegans* Johnson, 1901.

Material examined: CALIFORNIA, *Velero* station 887, east of Middle Farallon Island (68 m), Holotype and 6 Paratypes (AHF); Paratype (USNM 42026).

Description: None of the specimens are complete. The holotype is 3.8 cm long for about 80 setigers, 1.2 mm wide at the 20th setiger. The body is subcylindrical. There are dorsal transverse reddish brown bands of pigment on the anterior margin of anterior segments (Fig. 2a) and traces of pigment on the bases of the prostomial appendages and on the dorsal surface of the parapodia. This pigmentation pattern occurs on about the first 30 setigers.

The prostomium is triangular, and the frontal antennae are elongate-oval. The ceratophores of the occipital antennae are distinctly annulated. The styli of the inner paired antenna are the longest and reach to setiger 10 to 13. The palpi are large and globular.

The presetal lobes of the first few setigers are rounded and have a transverse fold (Fig. 2b, c). Postsetal lobes are elongate through about the first 10 setigers and gradually diminish in size posteriorly. Ventral cirri are cirriform through setiger 3 to 5, depending on size of the worm, and are padlike thereafter. The branchiae begin on the first setiger, except in the smallest worm (0.6 mm wide at the first segment) where they begin on setiger 4. When fully developed the branchiae are longer than the dorsal cirri (Fig. 2c, d).

The hooded pseudocompound hooks occur in the first 4 to 6 setigers. Their distribution in a paratype is as follows: the first setiger has 11 slender hooks, most of which are bidentate (Fig. 2e), the length of the blade is about 40 to 50 times the width of the blade at midlength, there

←

from same; g, tip of subacicular hook from 26th parapodium (teeth broken). Figures b–g from dissected paratype (AHF).

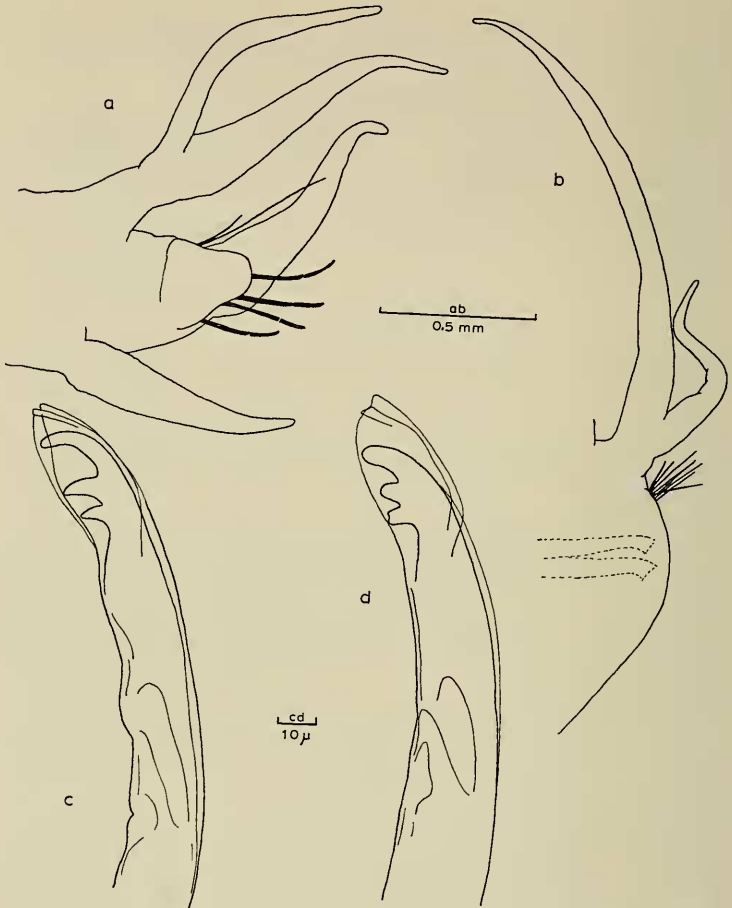


FIG. 3. *Onuphis iridescens* (F. H. Nichols' collection, Puget Sound): a, Anterior view of 1st parapodium; b, anterior view of 25th parapodium; c, pseudocompound hook from 1st parapodium; d, pseudocompound hook from 2nd parapodium of another specimen.

are 2 stout barely tridentate hooks (Fig. 2f), the second setiger has at least 8 slender hooks (7 bidentate, 1 tridentate) and 1 stout bidentate hook, the third setiger has 8 slender and 1 stout bidentate hook, the fifth setiger has 3 fairly slender and 3 stouter bidentate (or barely tridentate) hooks and 2 supraacicular limbate setae. The long slender pseudocompound hooks are most noticeable in the first 3 setigers. Hartman (1944) has given additional figures of the pseudocompound hooks.

There are no compound spinigers. Pectinate setae are distally slightly oblique, have about 11 teeth, and are first evident on the fifth setiger. Subacicular hooks (Fig. 2g) begin on the 10th setiger.

The mandibles of some specimens are calcified anteriorly. Maxilla I of a paratype is falcate. Maxilla II has 9 teeth on the left and 10 teeth on the right. Left maxilla III has 10 teeth and left maxilla IV has 6 teeth. The fused right maxilla III and IV has 11 teeth. Both maxillae V have a single tooth.

Sand grains of various sizes (0.1 to 2.0 mm diameter) adhere to the parchmentlike tube.

Diagnosis: An *Onuphis* species with reddish brown dorsal bands, cirriform branchiae from the first setiger, ventral cirri cirriform through the 5th setiger, mostly bidentate pseudocompound hooded hooks with very long slender blades, and subacicular hooks from the 10th setiger.

Remarks: This species most resembles *O. shirikishinaiensis* (Imajima) in having bidentate pseudocompound hooks with long slender blades. *Onuphis farallonensis* differs from *O. shirikishinaiensis* in having mostly bidentate hooks in the first 4 to 6 setigers, and in the first occurrence of subacicular hooks.

Distribution: Southern California, in 68 meters.

Onuphis iridescens (Johnson)

Figures 3a-d; 4a-c

Northia (sic) *iridescens* Johnson 1901, p. 408, pl. 8, figs. 86-87, pl. 9, figs. 88-92.

Nothria sp. near *N. elegans* and *N. iridescens*.—Banse, Hobson, and Nichols 1968 (in part, Form B only), p. 534.

Nothria iridescens.—Fauchald 1968, p. 24, pl. 7, fig. a.—Hartman 1944 (in part), p. 87, pl. 5, figs. 99-104; 1968, p. 681, figs. 1-3.—Moore 1911, p. 255. Not Hartman 1965, p. 104.

Onuphis iridescens.—E. Berkeley 1927, p. 408.—C. Berkeley 1967, p. 1056.—Berkeley and Berkeley 1948, p. 93, fig. 140.

Material examined: BRITISH COLUMBIA, Holotype of *N. iridescens* from Victoria (MCZ 1887).—Off Ruxton Passage, E. Berkeley, collector (USNM 38283). WASHINGTON, two specimens from Orcas Island (40 m) H. L. Sanders, collector.—Many specimens collected by the author from the Strait of Juan de Fuca (140-170 m).—Banse, Hobson, and Nichols' collections from Puget Sound (13-200 m). SOUTHERN CALIFORNIA, *Velero* stations 893, 981, 1130, 1133, 1135, 1137, 1157, 1348, 2175, 2354, 4785, 7028 (25-530 m) (AHF).

Description: The inner paired antennae of this species usually reach to setiger 13 to 20 (range, 7 to 25). The branchiae begin on the first setiger except in smaller specimens (see Fig. 4a). The first few pairs of branchiae are shorter than the dorsal cirri (as in Fig. 3a), but exceed the dorsal cirri in length thereafter. The branchiae are slender throughout

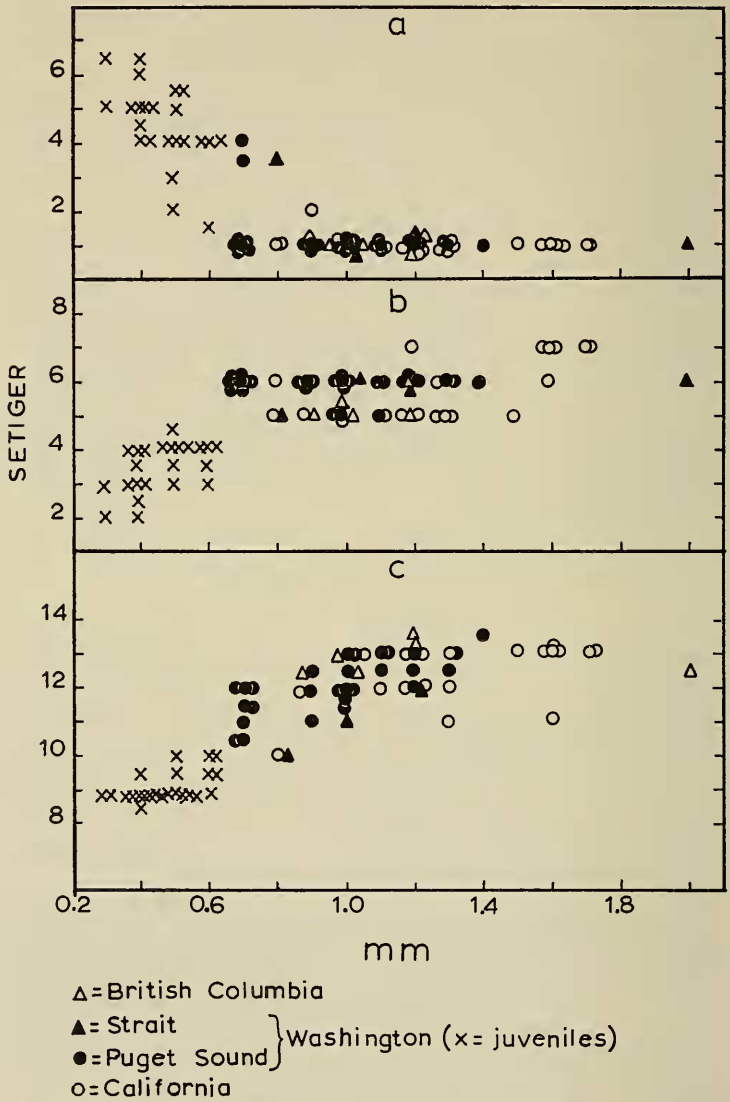


FIG. 4. Variation in specific characters of *O. iridescens* versus width of 1st segment (mm): a, First setiger with branchiae; b, last setiger with cirriform ventral cirrus; c, first setiger with subacicular hooks.

(Fig. 3b). The ventral cirri are usually cirriform through setigers 5 to 7, but through only 2 to 4 on smaller specimens (see Fig. 4b).

The first 3 to 5 setigers have tridentate pseudocompound hooks (Fig. 3c, d). The distal tooth of these setae usually extends further than in the setae of *O. elegans*; however, this character does not separate the species reliably. Narrowly limbate setae are present from the first setiger and appear faintly hairy. I have found pectinate setae no earlier than the 4th setiger. Subacicular hooks usually begin on setigers 11 to 14, but as early as 8 to 10 in smaller specimens (see Fig. 4c).

The tube is parchmentlike with adherent sand grains or a thick coating of mud.

Remarks: The size of individuals of *O. iridescens* must be considered when defining this species because of the size-dependent variation of some important characters (summarized in Figure 4). The juveniles (≤ 0.6 mm width at first segment) depicted in Fig. 4a-c all have slender branchiae, and were collected from stations where the only *Onuphis* species known to occur are *O. iridescens* or *O. iridescens* and *O. elegans*. Therefore these specimens probably do represent juveniles of *O. iridescens*.

Onuphis iridescens occasionally has been regarded as being close to *O. elegans*, if not synonymous (Hartman 1944, 1961; Monro, 1930). In Washington and British Columbia the adult specimens of the two species are easily distinguished by the shape of their branchiae, the first occurrence of subacicular hooks, and the length of the inner paired antennae. In California, however, some specimens have been found that appear to be intermediate between the two species (see below).

Onuphis iridescens occurs in deeper water than does *O. elegans*. Moore (1911) reports the former species from as deep as 1460 m in Monterey Bay; Fauchald (1968) reports it from as deep as 2400 m in western Mexico; Ushakov (1950) reports it from 252-1643 m in the Sea of Okhotsk; and Monro (1930) reports it from 650 m near the southern tip of South America. I have not verified the records from the western Pacific or southern Atlantic by examination of material.

Distribution: British Columbia to western Mexico, possibly also in the Sea of Okhotsk and the South Atlantic Ocean. In 13 to 2400 meters.

Onuphis sp. "intermediates"

Onuphis iridescens.—Hartman 1944 (in part), p. 87.

Material examined: CALIFORNIA, Tomales Bay (PMS 180240, 180242).—Southern California, *Velero* stations 887, 893, 1126, 2114, 2314, 3048, and 4842 (8-143 m) (AHF).

Description: These specimens range from 0.6 to 1.4 mm in width at the first segment. They may have either no pigmentation pattern or dorsal transverse reddish brown bands of pigment on the posterior part of each segment or in the intersegmental grooves. The inner paired antennae reach to setigers 7 to 17; the branchiae are slender throughout; ventral cirri are

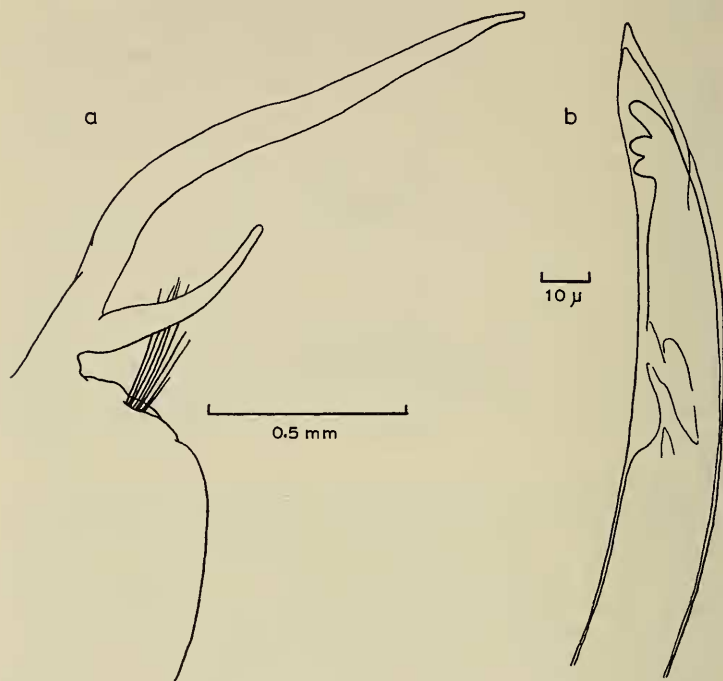


FIG. 5. *Onuphis opalina* (BCF): a, Anterior view of 24th parapodium; b, pseudocompound hook from 1st parapodium.

cirriform through setigers 5 or 6; hooded pseudocompound hooks are tridentate and occasionally have long slender blades; pectinate setae occur from the 5th setiger; and subacicular hooks begin on the 9th setiger.

Remarks: The "intermediates" resemble *O. iridescens* (see above) in the shape of the branchiae and *O. elegans* (see above) in the first occurrence of subacicular hooks. These specimens have been found in samples with *O. iridescens*, *O. elegans*, or *O. farallonensis*. However, I have found no samples from California in which one of these three species co-occurs with another. "Intermediates" are not known for Washington and British Columbia. In Puget Sound, *O. iridescens* and *O. elegans* do co-occur in the same grab sample. The "intermediates" may result from interbreeding between *O. elegans* and *O. iridescens* (and perhaps also *O. farallonensis*); they may represent a new species; or they may belong to a highly variable *O. iridescens*. Only through a laboratory

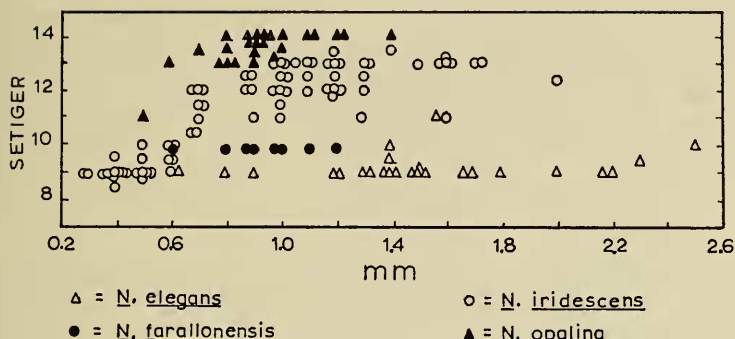


FIG. 6. First setiger with subacicular hooks versus width of first segment (mm) for four species of *Onuphis*. Values of, say, 13.5 are obtained from an individual whose subacicular hooks begin on setiger 13 on one side and 14 on the other side.

study involving interbreeding of the species in question can this problem be resolved.

Distribution: Southern and central California, in 8 to 143 meters.

Onuphis opalina (Verrill)

Figure 5a-b

Nothria opalina Verrill 1873, p. 102.

Onuphis (*Nothria*) *opalina*.—Pettibone 1963, p. 245, fig. 64.

Nothria iridescens.—Hartman 1965, p. 104. Not *N. iridescens* Johnson, 1901.

Material examined: NEW ENGLAND, numerous specimens from the shelf (26–229 m) (USNM 6110, 6114, 6137, 6144, 6764, 16038; BCF).—Four specimens from the slope, H. L. Sanders collector (station Slope 3, 300 m, 39°58'24"N, 70°40'18"W [AHF]; station F1, 1500 m, 39°47'N, 70°45'W).

Description: There is no noticeable pigment pattern. The inner paired antennae reach setigers 10 to 19. Anterior presetal lobes have a transverse fold. Branchiae are slender throughout (Fig. 5a). They begin on the first setiger in all specimens examined, except in the two specimens from 1500 meters, which have branchiae from the second setiger. Ventral cirri are cirriform through setigers 5 to 7, depending on the size of the worm. Pseudocompound hooks have 3 stout teeth (Fig. 5b) and occur on the first 4 to 5 setigers. Subacicular hooks begin on setigers 13 to 14, but on 11 in a smaller worm.

Remarks: *Onuphis opalina* is very closely related to *O. iridescens*, and its distribution in the northwest Atlantic parallels that of *O. iridescens* in the northeast Pacific. It differs from the latter species in having pseudocompound hooks with stouter teeth and a more pointed hood.

Also, for a worm of a given size, the subacicular hooks begin further posteriorly in *O. opalina* than in *O. iridescens* (see Fig. 6). Augener (1906) reports *O. opalina* from the West Indies, but his specimens cannot be found at the MCZ, so this record cannot be verified.

Distribution: From the Gulf of St. Lawrence to off Chesapeake Bay, possibly also the West Indies. In 26 to 2300 meters.

Key to Species of *Onuphis* with Cirriform Branchiae
from Setiger One

This key should be used only for specimens wider than 0.6 mm at the first segment, because of the size dependency of some of the characters in *O. iridescens*, *O. opalina*, and possibly *O. farallonensis*. Because I have seen no specimens of the two Japanese species, *O. shirikishinaiensis* (Imajima) 1960, and *O. holobranchiata* Marenzeller (1879), original descriptions were studied for their inclusion in the key. Types of the latter species cannot be found in Japan, and the species has not been collected again from the type locality (M. Imajima, personal communication). The four species studied also are distinguished by the first occurrence of subacicular hooks with respect to size (see Fig. 6).

1. Pseudocompound hooded hooks occur in setigers 1 through 4 to 6 and are mostly bidentate (Fig. 2e) with a few barely tridentate (Fig. 2f) *O. farallonensis*
- Pseudocompound hooded hooks tridentate in first 2 setigers and mostly bidentate in setigers 3 to 7 *O. shirikishinaiensis*
- Pseudocompound hooded hooks mostly tridentate (Figs. 1d; 3c, d) and rarely a few bidentate or quadridentate 2
2. Branchiae of setigers 10 through 60 to 80 are thick (Fig. 1b) *O. elegans*
- All branchiae are slender (Figs. 3b; 5a) 3
3. Presetal lobes on first 4 parapodia digitate. Subacicular hooks begin on setiger 18 *O. holobranchiata*
- Presetal lobes on anterior parapodia rounded (Fig. 3a). Subacicular hooks begin before setiger 15 4
4. Pseudocompound hooded hooks with short stout teeth and pointed hood (Fig. 5b). Subacicular hooks begin on setiger 13 to 14 (Fig. 6) *O. opalina*
- Pseudocompound hooded hooks with more slender teeth and less pointed hood (Figs. 3c, d) 5
5. Subacicular hooks begin on setiger 9 *Onuphis* sp. "intermediates"
- Subacicular hooks begin on setigers 11 to 14 (Fig. 6) ... *O. iridescens*

LUMBRINERIDAE

Lumbrineris Blainville

Lumbrineris pallida Hartman

Figure 7a-e

Lumbrineris pallida Hartman 1944, p. 166, pl. 12, figs. 270-274, pl. 13, figs. 275-277; 1968, p. 773, figs. 1-6.

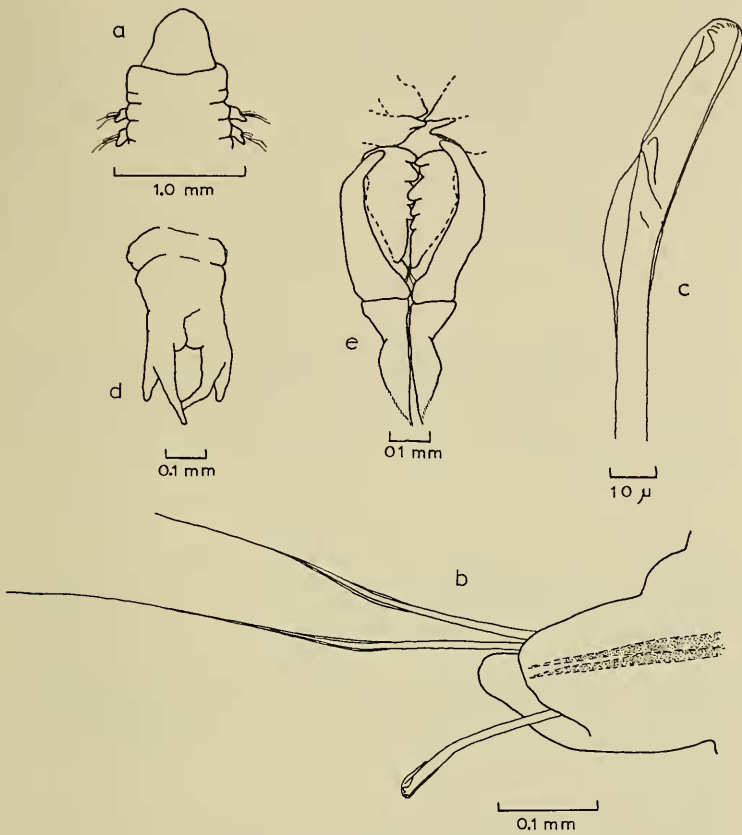


FIG. 7. *Lumbrineris pallida* (USNM 42661): a, Dorsal view of anterior end; b, anterior view of 20th parapodium (some setae missing); c, compound hook from 7th parapodium; d, dorsal view of pygidium slightly from left side; e, dorsal view of maxillae.

Material examined: CALIFORNIA, Hartman's type specimens from *Velero* station 1205 (AHF), and specimens from *Velero* stations 1388 and 4802 (AHF). WASHINGTON, two specimens collected by the author from 140 m depth in gravelly mud in the Strait of Juan de Fuca ($48^{\circ}22.4' N$, $124^{\circ}26.3' W$) (USNM 42661; AHF).

Description (specimens from Washington): A complete specimen has about 105 setigers and is about 0.8 mm wide without parapodia. The prostomium (Fig 7a) is bluntly conical.

The postsetal lobes of the parapodia (Fig. 7b) are longer than the

presetal lobes. In posterior segments, the postsetal lobes are only slightly longer than in anterior segments. In the California material the postsetal lobes are distally broader than in the Washington specimens.

The compound hooded hooks (Fig. 7c) occur from the first setiger through the 14th and 18th setigers. Capillary setae begin on the first setiger, gradually increase in length posteriorly and disappear at the 37th setiger. They appear to be longest at about the 20th setiger. In this region, a typical parapodium has four long limbate setae (the lower two being the longer ones) dorsal to and three simple hooded hooks ventral to the aciculae. The aciculae are black throughout the body.

The pygidium (Fig. 7d) terminates in four cirri, of which the dorsal pair is the longer one.

Maxilla I is falcate; II has 4 teeth on each side, or there may be a small fifth tooth on the right side; III and IV appear unidentate (Fig. 7e). Maxilla IV lacks the broad base depicted by Hartman (1944).

Distribution: Washington, in 140 meters (new record); southern California and Todos Santos Is., Mexico in 44 to 104 meters.

ARABELLIDAE

Drilonereis Claparède

Drilonereis longa Webster

Drilonereis longa Webster 1879, p. 240, pl. 7, figs. 84–88.—Hartman 1968, p. 801, fig. 1.—Pettibone 1963, p. 272, fig. 72.

Material examined: WASHINGTON, one specimen (USNM 42662) collected by the author from 140 m depth in gravelly mud in the Strait of Juan de Fuca (48°22.4'N, 124°26.3'W). MASSACHUSETTS, specimens from numerous stations in Cape Cod Bay (now deposited in Gray Museum).

Description: The specimen from Washington is 0.8 mm wide without parapodia and in several pieces. There appear to be 5 and 6 teeth on maxillae I and II, respectively. Maxillae III and IV are unidentate. The mandibles are missing, a condition which Webster noted in some of his specimens. The anterior parapodia are inconspicuous, and the far posterior parapodia are noticeably bilabiate.

Distribution: Washington (new record), southern California, and Massachusetts to Georgia. Intertidal to 2452 meters.

DORVILLEIDAE

Dorvillea Parfitt

Dorvillea caeca (Webster and Benedict)

Stauropcephalus caecus Webster and Benedict 1884, p. 721, pl. 4, figs. 44–48.—Ushakov 1955, p. 246, fig. 83.

Stauronereis caecus.—Pettibone 1963, p. 233, fig. 61;—1961, p. 181.

Material examined: WASHINGTON, near Orcas Island, 76 specimens collected by H. L. Sanders from muddy sediment in Massacre Bay (15 m),

Harney Pass (27 m), and West Sound (40 m) (14 specimens, USNM 42663; 62 specimens, in reference collection of Friday Harbor Laboratories). MASSACHUSETTS, numerous stations in Cape Cod Bay (4–58 m) (GM).

Description: The specimens from Washington have the furcate setae characteristic of this species, and seem to be identical to the Cape Cod Bay specimens.

Distribution: Washington (new record), Sea of Okhotsk, Bering Sea, Gulf of St. Lawrence to Massachusetts. Low water to 155 meters.

Protodorvillea Pettibone

Protodorvillea gracilis (Hartman)

Stauronereis gracilis Hartman 1938, p. 100, figs. 36–38.

Protodorvillea recuperata Banse and Nichols 1968, p. 225, fig. 1.

Dorvillea gracilis.—Hartman and Reish 1950, p. 25.

Dorvillea kefersteini.—Berkeley and Berkeley 1960, p. 791.—C. Berkeley 1967, p. 1056. Not *Staurocephalus kefersteini* McIntosh 1869.

Protodorvillea gracilis.—Pettibone 1961, p. 180.—Hartman 1968, p. 825, figs. 1–3.

Material examined: WASHINGTON, Puget Sound, Holotype of *P. recuperata* (USNM 36282). CALIFORNIA, Holotype of *S. gracilis* (USNM 20364; Paratype, AHF).—*Velero* stations 905, 1451, and 2788 (AHF). WESTERN CANADA, E. and C. Berkeleys' specimen from plankton (50–0 m) (USNM 39304).

Description: The structure of the parapodial lobe of *P. gracilis* and the emergence of the setae are as described below for *P. kefersteini*. The lobe from which the compound setae emerge may be withdrawn and appear as in Fig. 37 of Hartman (1938) or it may be extended as in Fig. 8b.

The Berkeleys' specimen, taken from a plankton sample, has very long capillary setae in its median parapodia.

Remarks: Banse and Nichols (1968) also noted that some parapodial lobes of a specimen may be withdrawn. The only difference that I have observed between the specimens of *P. gracilis* from Washington and specimens of *P. kefersteini* from Massachusetts and Ireland is the prominence of the subterminal spines on the compound setae of the former (see Banse and Nichols, 1968, Fig. 1h, i); I could discern subterminal spines only on the superiormost compound setae of the latter, where they are fairly indistinct.

Although the minor difference between *P. kefersteini* and *P. gracilis* probably is not of specific importance, it seems best at present to retain the latter name for the populations of the northeastern Pacific.

Distribution: British Columbia (new record, by Berkeleys 1960, as *D. kefersteini*), Washington (new record, by Banse and Nichols 1968, as *P. recuperata*), Oregon and California. Intertidal zone and shelf depths.

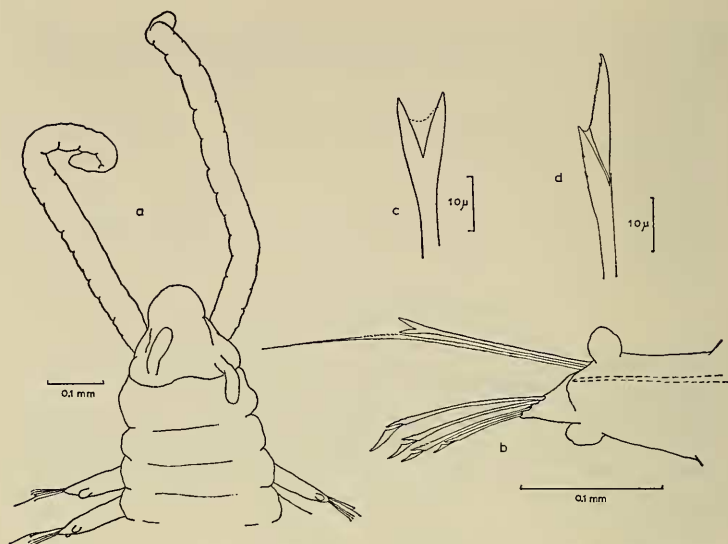


FIG. 8. *Protodorvillea kefersteini* (GM 1412): a, Dorsal view of anterior end; b, posterior view of 10th parapodium; c, furcate seta; d, compound seta (next to uppermost).

Protodorvillea kefersteini (McIntosh)

Figure 8a-d

Staurocephalus kefersteini McIntosh 1869, p. 417, pl. 16, fig. 11.—Southern 1914, p. 84. Not *Dorvillea kefersteini* Berkeley and Berkeley 1960. *Protodorvillea kefersteini*.—Pettibone 1961, p. 180.

Material examined: SCOTLAND, Lochmaddy, a type specimen of *S. kefersteini* (BMNH). IRELAND, Blacksod Bay, R. Southern collector (BMNH). MASSACHUSETTS, Cape Cod Bay in gravelly sand (St. 1412, 15 m, 41°54.5'N, 70°8.0'W and St. 1514, 18 m, 41°53.5'N, 70°10.7'W) (200+ specimens, GM; 8 specimens, USNM 42027).

Description: The complete specimens are about 5 mm long for 50 to 60 setigers. They differ from the specimens of McIntosh and Southern in lacking eyes. The antennae are clavate and very indistinctly articulated (Fig. 8a). In many specimens, there is no noticeable articulation. The parapodial lobes are usually prolonged (Fig. 8b), but may be so withdrawn that they do not extend much beyond the acicula. The dorsal cirri are variable in form and may be more prolonged than is shown in Fig. 8b. The furcate setae have two nearly equal branches (Fig. 8c). The compound setae (Fig. 8d) emerge from the tip of the parapodium; thus there are neither presetal nor postsetal lobes.

The antennae of McIntosh's and Southern's specimens are clavate and as indistinctly articulated as in Fig. 8a. The structure of the parapodium and the emergence of the setae are as described for the Cape Cod Bay specimens, although the parapodial lobes are not quite as prolonged as in the latter.

Distribution: Massachusetts (new record) and Europe. Intertidal to 44 meters.

LITERATURE CITED

- AUGENER, H. 1906. Westindische Polychaeten. Bull. Mus. Comp. Zool., 43: 91-196.
- BANSE, K., K. D. HOBSON, AND F. H. NICHOLS. 1968. Annotated list of polychaetes. p. 521-548. In Lie, Ulf. A quantitative study of benthic infauna in Puget Sound, Washington, USA, in 1963-1964. FiskDir. Skr. Ser. HavUnders., 14: 229-556.
- AND F. H. NICHOLS. 1968. Two new species and three new records of benthic polychaetes from Puget Sound (Washington). Proc. Biol. Soc. Wash., 81: 223-230.
- BERKELEY, C. 1967. A checklist of Polychaeta recorded from British Columbia since 1923, with reference to name changes, descriptions, and synonymies. I. Errantia. Canad. Jour. Zool., 45: 1040-1059.
- BERKELEY, E. 1927. Polychaetous annelids from the Nanaimo district, 3: Leodicidae to Spionidae. Contr. Canad. Biol., n.s., 3: 407-422.
- AND C. BERKELEY. 1932. On a collection of littoral Polychaeta from the west coast of Vancouver Island. Contr. Canad. Biol., n.s., 7: 309-318.
- . 1948. Annelida, Polychaeta Errantia. Canad. Pac. Fauna, no. 9b(1). Fish. Res. Bd. Canada, 1-100.
- . 1960. Some further records of pelagic Polychaeta from the Northeast Pacific north of latitude 40°N. and east of longitude 175°W., together with records of Siphonophora, Mollusca, and Tunicata from the same region. Canad. Jour. Zool., 38: 787-799.
- FAUCHALD, K. 1968. Onuphidae (Polychaeta) from western Mexico. Allan Hancock Monogr. Mar. Biol., no. 3, 82 pp.
- HARTMAN, O. 1938. Descriptions of new species and new generic records of polychaetous annelids from California of the families Glyceridae, Euniciidae, Staunonereidae, and Opheliidae. Univ. Calif. Publ. Zool., 43: 93-112.
- . 1944. Polychaetous annelids. Part 5. Eunicea. Allan Hancock Pacific Expeditions, 10: 1-237.
- . 1961. Polychaetous annelids from California. Allan Hancock Pacific Expeditions, 25: 1-226.

- . 1965. Deep-water benthic polychaetous annelids off New England to Bermuda and other North Atlantic areas. Allan Hancock Found. Publ., Occas. Pap. 28: 1-378.
- . 1968. Atlas of the Errantiate Polychaetous Annelids from California. Allan Hancock Foundation, University of Southern California, Los Angeles. 828 pp.
- AND D. J. REISH. 1950. The marine annelids of Oregon. Oregon State Monogr. Studies in Zool., 6: 1-64.
- IMAJIMA, M. 1960. Description of a new polychaete, *Nothria shirishinaiensis* n. sp. of the family Eunicidae. Publ. Seto Mar. Biol. Lab., 8: 55-58.
- JOHNSON, H. P. 1901. The Polychaeta of the Puget Sound region. Proc. Boston Soc. Nat. Hist., 29: 381-437.
- MCINTOSH, W. C. 1869. On the structure of the British nemerteans, and some new British annelids. Trans. Roy. Soc. Edinburgh, 25: 305-433.
- MARENZELLER, E. 1879. Südjapanische Anneliden. I. Denkschr. Acad. Wiss. Wien, 41: 109-154.
- MONRO, C. C. A. 1930. Polychaete worms. Discovery Repts. 2: 1-222.
- MOORE, J. P. 1911. The polychaetous annelids dredged by the U. S. S. "Albatross" off the coast of southern California in 1904: III. Euphrosynidae to Goniadidae. Proc. Acad. Nat. Sci. Phila., 63: 234-318.
- PETTIBONE, M. H. 1961. New species of polychaete worms from the Atlantic Ocean, with a revision of the Dorvilleidae. Proc. Biol. Soc. Wash. 74: 167-186.
- . 1963. Marine polychaete worms of the New England region. I. Aphroditidae through Trochochaetidae. Bull. U. S. Nat. Mus., 227: 1-356.
- SOUTHERN, R. 1914. Archiannelida and Polychaeta, in Clare Island survey, pt. 47, Proc. Roy. Irish Acad. Dublin, 31: 1-160.
- USHAKOV, P. V. 1950. Polychaeta of the Sea of Okhotsk. Issled. Dal'nevost. Morei SSSR, no. 2: 140-234. In Russian.
- . 1955. Polychaeta of the Far Eastern Seas of the USSR. Akad. Nauk SSSR, Opred. Faune SSSR, 56: 1-445. In Russian, Transl. (1965), Israel Program Scient. Transl., U.S. Dept. of Commerce, Washington, D.C., pp. 1-419.
- VERRILL, A. E. 1873. Brief contributions to zoology from the museum of Yale College. No. 2. Results of recent dredging expeditions on the coast of New England. Amer. Jour. Sci. Arts, 5: 98-106.
- WEBSTER, H. E. 1879. Annelida Chaetopoda of the Virginia coast. Trans. Albany Inst., 9: 202-272.
- AND J. E. BENEDICT. 1884. The Annelida Chaetopoda from Provincetown and Wellfleet, Massachusetts. Rept. U.S. Fish Comm. for 1881, pp. 699-747.